

AMIT SHYAM

Address: Oak Ridge National Laboratory
1 Bethel Valley Road, P.O. Box - 2008
Oak Ridge, TN - 37831-6115

Phone (O): (865) 2414941
Fax: (865) 574 6098
Email:shyama@ornl.gov

EDUCATION

- Michigan Technological University** 1997 – 2002
- PhD in Materials Science and Engineering (GPA: 4.0 / 4.0)
- Indian Institute of Technology (IIT), Kanpur** 1993 – 1997
- B.Tech in Materials and Metallurgical Engineering

RESEARCH INTERESTS

- Structural materials
- Alloy design
- Mechanical behavior of materials
- High temperature aluminum alloys
- Additive Manufacturing

EMPLOYMENT EXPERIENCE

Oak Ridge National Laboratory (ORNL) Oak Ridge, TN (Nov 2004 to present)
Post-Doctoral Research Associate (Nov 2004 – Dec 2008)
Research Associate, R & D Staff, Senior R & D Staff Scientist (Jan 2009 – March 2023)
Digital Metallurgy Initiative Lead (August 2020 – Present)
Group Leader of Alloy Behavior and Design Group (March 2021-Present)
Distinguished R & D Staff (April 2023 – Present)

- Lead a group of physical metallurgists in Materials Science and Technology division at ORNL
- Lead Principal Investigator (PI) in multiple efforts
- Experienced in developing programs, writing proposals, interacting with customers, and leading large multi-institution research teams
- Conceived and currently lead an ORNL initiative titled Digital Metallurgy
- Mentor graduate students, post-doctoral researchers, and staff scientists

University of Tennessee Knoxville, TN (August 2015 to present)
The Bredesen Center for Interdisciplinary Research and Graduate Education / ORNL Graduate Advisor

- Advise doctoral students

Colorado School of Mines Golden, CO (November 2017 to March 2021)
Affiliate Professor, Metallurgical and Materials Engineering

- Advise doctoral students

University of Michigan and Ford Research Laboratories Ann Arbor, MI (Oct 2002 to Oct 2004)
Post Doctoral Research Fellow

- Developed an automated small fatigue crack growth detection system
- Developed fatigue testing system for superalloys at high temperature (600°C) and ultrasonic frequencies
- Mentored undergraduate and graduate students on their research projects
- Assisted in proposal writing and taught guest lectures

Michigan Technological University Houghton, MI (August 1997 to Sept 2002)
Graduate Research Assistant

- Dissertation Title: Deformation and Fatigue Behavior of the Nickel-Base Superalloy KM4
- Quantified fracture surface using stereomicroscopy and related it to deformation mechanisms
- Modeling of slip irreversibility, fracture surface roughness and fatigue crack propagation threshold
- Provided failure analysis consultancy to local companies

- Thesis title: Growth during recrystallisation in boron doped Ni₇₆Al₂₄
- Other Research: Reaction synthesis of Iron Aluminides

HONORS AND ACTIVITIES

- Technical Reviewer for – Acta Materialia; Nature Materials; Nature Communications; Nature Scientific Reports; Additive Manufacturing; Metallurgical and Materials Transactions A; Journal of Power Sources; Journal of the American Ceramic Society; Scripta Materialia; Materials & Design; Journal of Alloys and Compounds; Materials Characterization; International Journal of Fatigue; Journal of Materials Science; JOM; Surface and Coatings Technology; Experimental Mechanics; Acta Biomaterialia; Materials Science and Engineering A; Optics and Lasers in Engineering; Journal of Pressure Vessel Technology; Journal of the European Ceramic Society; International Journal of Applied Ceramic Technology; ACS Nano; DOE Small Business Innovation Research (SBIR) Proposals; Naval Research Laboratory (NRL/ASEE); ORNL internal papers and proposals
- Director's Research and Development Initiative Lead for Digital Metallurgy at ORNL – August 2020 to present
- R & D 100 Award Winner in 2023 for Open-AM – September 2023
- Vehicle Technologies Office – EERE – US DOE office level Team Award for DuAlumin-3D alloy development – June 2023
- Keynote speaker for Society of Experimental Mechanics Annual Conference 2023 - Mechanics of Additive and Advanced Manufacturing track – June 2023
- MS&T Division Team Award for DuAlumin-3D alloy development – January 2023
- ASM International Historic Landmark Selection Award Committee – January 2023 to present
- R & D 100 Award Winner in 2022 for DuAlumin-3D Alloys – September 2022
- R & D 100 Award Finalist in 2021 for High-Temperature Printable (HTP) Aluminum Alloys – October 2021
- Board of Review (Key Reader), Metallurgical and Materials Transactions
- Journal Cover, Materials & Design, January 2021
- R & D 100 Award Finalist in 2020 for PrintCast Metal-Metal composites – October 2020
- Proton Power Upgrade for SNS Design Review Team member - Fatigue expert - June 2020
- Lead Organizer and Report Writer - Frontiers of Structural Materials Workshop at ORNL, August 2019
- Team Lead - UT Battelle Award for Team Accomplishment for ACMZ Cast Al Alloys, September 2018
- TMS – EPD Materials Characterization Best Poster Award – Third Place – TMS Annual Meeting – Phoenix, March 2018
- R & D 100 Award Winner in 2017 for ACMZ Cast Aluminum Alloys – November 2017
- Journal Cover, Advanced Materials & Processes, October 2017
- Chair (2018-2019), Vice-chair (2017) and Secretary (2016) – Oak Ridge Chapter of ASM International
- Member – Mechanical Behavior of Materials Committee – TMS
- TMS/EPD Materials Characterization Best Poster Award – Third Place – March 2017
- Physical Sciences Directorate Professional Development Committee – ORNL – 2017
- ORNL Significant Event Award (SEA) - New High Temperature Cast Aluminum Alloys – December 2016
- ASM IIM Visiting Lecturer Award 2015
- ORNL Data Expert for LightMat Consortium
- Member, SNS Target Advisory Panel for Analysis and Materials, May 2015
- Co-organizer, High-temperature Systems for Energy Conversion and Storage, TMS Annual Meeting, San Diego, February 2017
- Co-organizer, High-temperature Systems for Energy Conversion and Storage, TMS Annual Meeting, Nashville, February 2016
- Lead Editor, Special Issue of International Journal of Fatigue and Microstructure, December 2013.
- 2014 Excellence in Technology Transfer Award, FLC Southeast Region - SYMMETRIX® HPX-F Lithium-Ion Battery Nanocomposite Separator
- Poster Session Judge, 38th International Conference and Expo on Advanced Ceramics and Composites, Daytona Beach – January 2014
- Winner, 2013 TMS Micrograph Project
- R & D 100 Award in 2013 for SYMMETRIX® HPX-F Lithium-Ion Battery Nanocomposite Separator
- 2014 Award for Excellence in Technology Transfer by the Federal Laboratory Consortium (FLC) – SYMMETRIX® HPX-F Lithium-Ion Battery Nanocomposite Separator
- Co-organizer of Symposium on Materials Performance, THERMEC 2013 – December 2013
- International Scientific Committee, THERMEC 2013 – December 2013

- Co-organizer, High-temperature Systems for Energy Conversion and Storage, TMS Annual Meeting, Orlando, March 2015
- Materials Genome Initiative (MGI) Digital Data Community Development Team Member – TMS
- Finalist, The next big idea competition - ORNL - April 2014
- Oak Ridge Postdoctoral Symposium, Poster Session Judge, July 2014
- Poster Session Judge, 37th International Conference and Expo on Advanced Ceramics and Composites, Daytona Beach – January 2013
- Lead organizer, Fatigue and Microstructure: A Symposium on Recent Advances, MS&T 2011
- Co-organizer, ASM Educational Symposium on Innovations in Mechanical Testing, Oak Ridge, April 2011
- Journal Cover, Journal of the American Ceramic Society, July 2008
- Executive Committee Member, Oak Ridge Chapter of ASM International, 2007-2011
- Judge, Oak Ridge Chapter of ASM Scholarship, 2007
- Best Student Paper Award, Magnesium Technology 2005, Light Metals Division – TMS
- Finishing Fellowship, Michigan Technological University, Summer 2002
- Challenge Fellowship, Michigan Technological University, 1998 to Feb 2000
- Forging Achievement Award, Forging Industry Educational Research Foundation (FIERF), 1999
- Member, Honor Society of Phi Kappa Phi, 1999
- Award for Academic Excellence, Academic Senate, IIT Kanpur, 1996
- Member, The Minerals, Metals and Materials Society (TMS)
- Member, ASM International

SELECTED ORNL PROJECTS

- *Digital Metallurgy* – Lead Principal Investigator (PI) - Director’s Research and Development Initiative at ORNL at the intersection of physical metallurgy and digital manufacturing. August 2019 – September 2024 (Total funding ~ \$7 million)
- *Sustainable Aluminum Alloy for Lightweight Ultra-large Castings* – ORNL PI – LightMAT project between ORNL and General Motors. DOE, Office of Vehicle Technologies. PI on project with total funding - \$1 million. January 2023 – January 2025.
- *Advanced Aluminum Alloys for Medium Duty Lightweight Engines* - A cooperative research and development agreement (CRADA) between ORNL and General Motors. DOE, Office of Vehicle Technologies. Lead PI on project with total funding - \$5.50 million. \$ 0.8 million in funding from August 2020 – August 2024.
- *Propulsion Material Core Programs* – Co-PI/Thrust Lead. DOE, Office of Vehicle Technologies (VTO-EERE). Lead PI on project with total funding of \$30 million over 5 years (PI on projects totaling ~\$10 million in funding over 5 years starting October 2018)
- *Supercomputers to Superalloys* – PI on LDRD project that directly contributed to the successful proposal from VTO-EERE for the Propulsion Material Core Program (October 2016 – September 2018). \$0.9 million in funding.
- *Commercialization of ACMZ alloys* – PI on TIP project with General Motors as partner (\$190K in funding). January – December 2018.
- *High Performance Cast Aluminum Alloys for Next Generation Passenger Vehicle Engines* - A cooperative research and development agreement (CRADA) between ORNL, Chrysler and NemaK. DOE, Office of Vehicle Technologies. Lead PI on project with total funding - \$5.50 million.
- *Durability and reliability of substrates for solid oxide fuel cells (SOFCs)* – Funded at ORNL by the Solid State Energy Conversion (SECA) Program through a CRADA with LG Fuel Cell Systems (LGFC) DOE, Office of Fossil Energy. Lead PI on project with total funding - \$ 2.35 million.
- *Remaining high cycle fatigue life prediction of main feedpump turbine blades* – Funded at ORNL by Electric Power Research Institute (EPRI). Lead PI on project.
- *High-Strength, Lightweight Engines for Heavy-Duty Diesel Trucks* – Co-PI on a cooperative research and development agreement (CRADA) between ORNL and Cummins Inc. DOE, Office of Vehicle Technologies. \$ 4.10 million.
- *Durability and reliability of solid oxide fuel cells (SOFCs)* – Funded at ORNL by the Solid State Energy Conversion (SECA) Program. DOE, Office of Fossil Energy.
- *Durability and reliability of diesel particulate filters* – A cooperative research and development agreement (CRADA) between ORNL, Cummins Inc and Corning Inc. DOE, Office of Vehicle Technologies.
- *Materials for High-Pressure Fuel Injection Systems* – A cooperative research and development agreement (CRADA) between ORNL and Caterpillar Inc. DOE, Office of Vehicle Technologies.
- *Materials for Advanced Turbocharger Designs* – A cooperative research and development agreement (CRADA) between ORNL and Honeywell. DOE, Office of Vehicle Technologies.
- *Mechanical characterization of materials for innovative levee strengthening systems* – A project with Jackson State University sponsored by the Department of Homeland Security.

- *High Temperature Materials Laboratory User Program* – Executed >10 projects as staff member in the HTML User Program.

ARCHIVAL JOURNAL PUBLICATIONS

- A. E. Perrin, R. A. Michi, D. N. Leonard, K. D. Sisco, A. J. Plotkowski, **A. Shyam**, J. D. Poplawsky, L. F. Allard, Y. Yang “Effect of Mn on eutectic phase equilibria in Al-rich Al-Ce-Ni alloys” *Journal of Alloys and Compounds* Volume 965, 171455, November 2023.
- T. Wu, J. D. Poplawsky, L. F. Allard, A. Plotkowski, **A. Shyam**, D. C. Dunand “Microstructure and strengthening of Al-6Ce-3Ni-0.7 Fe (wt%) alloy manufactured by laser powder-bed fusion” *Additive Manufacturing*, Volume 78, 103858, September 2023.
- T. Wu, A. Plotkowski, **A. Shyam**, D. C. Dunand “Microstructure and mechanical properties of hypoeutectic Al-6Ce-3Ni-0.7Fe (wt.%) alloy” *Materials Science and Engineering A*, Volume 875, 145072, June 2023.
- J. U. Rakhmonov, B. Milligan, S. Bahl, D. Ma, **A. Shyam**, D. C. Dunand “Progression of creep deformation from grain boundaries to grain interior in Al-Cu-Mn-Zr alloys” *Acta Materialia*, Volume 250, 189223, May 2023.
- R. A. Michi, J. J. Simpson, S. Bahl, Q. Campbell, P. Brackman, A. Plotkowski, R. R. Dehoff, J. A. Haynes, Q. Wang, **A. Shyam**, “Additively manufactured Al-Ce-Ni-Mn alloy with improved elevated-temperature fatigue resistance” *Additive Manufacturing*, Volume 66, 103477, March 2023.
- S. Bahl, A. Plotkowski, T.R. Watkins, R.A. Michi, B. Stump, D.N. Leonard, J.D. Poplawsky, R.R. Dehoff, **A. Shyam**, “3D printed eutectic alloy has facility for site-specific properties” *Additive Manufacturing*, Volume 70, 103551, May 2023.
- **A. Shyam**, S. Bahl, “Heat resistant aluminum alloys” *Nature Materials*, Volume 22, pp. 425-426, April 2023 (invited).
- R. A. Michi, S. Bahl, C.M. Fancher, K. Sisco, L.F. Allard, K. An, D. Yu, R.R. Dehoff, A. Plotkowski, **A. Shyam**, “Load shuffling during creep deformation of an additively manufactured AlCuMnZr alloy” *Acta Materialia*, Volume 244, 118557, January 2023.
- N. S. Harsha Gunda, R. A. Michi, M. F. Chisholm, **A. Shyam**, D. Shin, “First-principles study of Al/Al₃Ni interface” *Computational Materials Science*, Volume 217, 111896, January 2023.
- A. Perrin, S. Bahl, D.N. Leonard, R. Michi, K. Sisco, A. Plotkowski, **A. Shyam**, R. Dehoff, D. Shin, Y. Yang, “Phase stability in Cast and Additively Manufactured Al-rich Al-Cu-Ce alloys” *Journal of Alloys and Compounds* Volume 926, 166984, December 2022.
- B. Gwalani, J. Liu, S. Lambeets, M. Olszta, J. Poplawsky, **A. Shyam**, A. Devaraj, “Rapid assessment of interfacial stabilization mechanisms of metastable precipitates to accelerate high-temperature Al-alloy development” *Materials Research Letters*, Volume 10, No. 12, pp 771-779, 2022.
- T. Ajantiwalay, R. Michi, C. Roach, **A. Shyam**, A. Plotkowski, A. Devaraj, “Influence of Microstructural Heterogeneities on Small-Scale Mechanical Properties of an Additively Manufactured Al-Ce-Ni-Mn Alloy” *Additive Manufacturing Letters*, Volume 3, 100092, December 2022.
- J.D. Poplawsky, R.A. Michi, L.F. Allard, S. Bahl, A.J. Plotkowski, **A. Shyam**, “Using θ' Interfaces as Templates for Planar L12 Precipitation in AlCuMnZr Alloys” *Additive Manufacturing Letters*, Volume 3, 100086, December 2022.
- G. L. Knapp, M. Gussev, **A. Shyam**, T. Feldhausen, A. Plotkowski, “Microstructure, deformation and fracture mechanisms in Al-4043 alloy produced by laser hot-wire additive manufacturing” *Additive Manufacturing*, Volume 59, 103150, November 2022.
- X. Hu, S. Bahl, **A. Shyam**, A. Plotkowski, B. Milligan, L. Allard, J.A. Haynes, Y. Ren, A. Chuang, Repurposing the θ (Al₂Cu) phase to simultaneously increase the strength and ductility of an additively manufactured Al-Cu alloy, *Materials Science & Engineering A*, Volume 850, 143511, August 2022.
- B. Milligan, D. Ma, L. Allard, A. Clarke, **A. Shyam**, “Dislocation- θ' (Al₂Cu) interactions during creep deformation of an Al-Cu alloy” *Scripta Materialia* Volume 217, 114739, August 2022.
- S. Bahl, J.U. Rakhmonov, C. Kenel, D.C. Dunand, **A. Shyam**, “Effect of grain-boundary θ -Al₂Cu precipitates on tensile and compressive creep properties of cast Al-Cu-Mn-Zr alloys” *Materials Science & Engineering A*, Volume 840, 142946, April 2022.
- R.A. Michi, K. Sisco, S. Bahl, L.F. Allard, K.B. Wagner, J.D. Poplawsky, D.N. Leonard, R.R. Dehoff, A. Plotkowski, **A. Shyam**, “Microstructural evolution and strengthening mechanisms in a heat-treated additively manufactured Al-Cu-Mn-Zr alloy” *Materials Science & Engineering A*, Volume 840, 142928, April 2022.
- J.U. Rakhmonov, S. Bahl, **A. Shyam**, D.C. Dunand, “Cavitation-resistant intergranular precipitates enhance creep performance of θ' -strengthened Al-Cu based alloys” *Acta Materialia*, Volume 228, 117788, April 2022.
- R.A. Michi, A. Plotkowski, **A. Shyam**, R.R. Dehoff, S.S. Babu, “Towards high-temperature applications of aluminum alloys enabled by additive manufacturing” *International Materials Reviews*, Volume 67, No. 3, pp. 298-345, 2022.

- R.A. Michi, K. Sisco, S. Bahl, Y. Yang, J.D. Poplawsky, L.F. Allard, R.R. Dehoff, A. Plotkowski, **A. Shyam**, "A creep-resistant additively manufactured Al-Ce-Ni-Mn alloy" *Acta Materialia*, Volume 227, 117699, April 2022.
- T. Wu, A. Plotkowski, **A. Shyam** and D. C. Dunand, "Microstructure and creep properties of cast near-eutectic Al-Ce-Ni alloys" *Materials Science and Engineering A*, Volume 833, 142551, January 2022.
- S. Bahl, K. Sisco, Y. Yang, F. Theska, S. Primig, L.F. Allard, R.A. Michi, C. Fancher, B. Stump, R. Dehoff, **A. Shyam**, A. Plotkowski, Al-Cu-Ce(-Zr) alloys with an exceptional combination of additive processability and mechanical properties, *Additive Manufacturing* Volume 48 (2021) 102404, December 2021.
- S. Bahl, A. Plotkowski, K. Sisco, D. N. Leonard, L. F. Allard, R. A. Michi, J. D. Poplawsky, R. Dehoff, **A. Shyam**, "Elevated temperature ductility dip in an additively manufactured Al-Cu-Ce alloy" *Acta Materialia*, Volume 220, 117285, November 2021.
- M.F. Chisholm, D. Shin, G. Duscher, M.P. Oxley, L.F. Allard, J.D. Poplawsky, **A. Shyam**, "Atomic structures of interfacial solute gateways to θ' precipitates in Al-Cu alloys" *Acta Materialia*, Volume 212, 116891, June 2021.
- B. Milligan, D. Ma, L. Allard, A. Clarke and **A. Shyam**, "Crystallographic Orientation-Dependent Strain Hardening in a Precipitation-Strengthened Al-Cu Alloy" *Acta Materialia*, Volume 205, 116577, February 2021.
- S. Bahl, L. Xiong, L. F. Allard, R. A. Michi, J. D. Poplawsky, A. C. Chuang, D. Singh, T. R. Watkins, D. Shin, J. A. Haynes, **A. Shyam**, "Aging behavior and strengthening mechanisms of coarsening resistant metastable θ' precipitates in an Al-Cu alloy" *Materials & Design*, Volume 198, 109378, January 2021 (**cover image**).
- P. Shower, J. Poplawsky, S. Bahl, **A. Shyam**, "The role of Si in determining the stability of the θ' precipitate in Al-Cu-Mn-Zr alloys" *Journal of Alloys and Compounds*, Volume 862, 158152, December 2020.
- Y. Yang, S. Bahl, K. Sisco, M. Lance, D. Shin, **A. Shyam**, A. Plotkowski and R. R. Dehoff, "Primary solidification of ternary compounds in Al-rich Al-Ce-Mn alloys" *Journal of Alloys and Compounds*, Volume 844, 156048, December 2020.
- S. Bahl, X. Hu, K. Sisco, J. A. Haynes and **A. Shyam**, "Influence of copper content on the high temperature tensile and low cycle fatigue behavior of cast Al-Cu-Mn-Zr alloys" *International Journal of Fatigue*, Volume 140, 105836, November 2020.
- J. Cheng, M. Gushev, J. Allen, X. Hu, A. Moustafa, D. A. Splitter and **A. Shyam** "Deformation and failure of PrintCast A356/316 L composites: Digital image correlation and finite element modeling" *Materials & Design*, Volume 195, 109061, October 2020.
- A. Plotkowski, K. Sisco, S. Bahl, **A. Shyam**, Y. Yang, L. Allard, P. Nandwana, A. Marquez Rossy and R. R. Dehoff, "Microstructure and properties of a high temperature Al-Ce-Mn alloy produced by additive manufacturing" *Acta Materialia*, Volume 196, pp. 595-608, September 2020.
- J. Peng, S. Bahl, **A. Shyam**, J. A. Haynes and D. Shin, "Solute-vacancy clustering in aluminum" *Acta Materialia*, Volume 196, pp. 747-758, September 2020.
- J. D. Poplawsky, B. K. Milligan, L. F. Allard, D. Shin, P. Shower, M. F. Chisholm and **A. Shyam**, "The synergistic role of Mn and Zr/Ti in producing θ'/L_{12} co-precipitates in Al-Cu alloys" *Acta Materialia*, Volume 194, pp. 577-586, August 2020.
- **A. Shyam**, A. Plotkowski, S. Bahl, K. Sisco, L.F. Allard, Y. Yang, J. A. Haynes and R. R. Dehoff, "An additively manufactured AlCuMnZr alloy microstructure and tensile mechanical properties" *Materialia*, Volume 12, 100758, August 2020.
- G. D. Samolyuk, M. Eisenbach, D. Shin, Y. N. Osetsky, **A. Shyam** and J. R. Morris, "Equilibrium solute segregation to matrix- θ' precipitate interfaces in Al-Cu alloys from first principles" *Physical Review Materials*, Volume 4, 073801, July 2020.
- A. S. Sabau, B. K. Milligan, S. Mirmiran, C. Glaspie, **A. Shyam**, J. A. Haynes, A. F. Rodriguez, J. A. Gonzales Villarreal and J. Talamantes, "Grain Refinement Effect on the Hot-Tearing Resistance of Higher-Temperature Al-Cu-Mn-Zr Alloys" *Metals*, Volume 10, 430, April 2020.
- S. Bahl, X. Hu, E. Hoar, J. Cheng, J.A. Haynes and **A. Shyam**, "Effect of copper content on the tensile elongation of Al-Cu-Mn-Zr alloys: Experiments and finite element simulations" *Materials Science and Engineering A*, Volume 772, 138801, January 2020.
- B. K. Milligan, S. Roy, C. S. Hawkins, L. F. Allard and **A. Shyam**, "Impact of microstructural stability on the creep behavior of cast Al-Cu alloys" *Materials Science and Engineering A*, Volume 772, 138697, January 2020.
- **A. Shyam**, S. Roy, D. Shin, L.F. Allard, J. D. Poplawsky, Y. Yamamoto, J. R. Morris, B. Mazumder, J. C. Idrobo, A. Rodriguez, T. R. Watkins and J. A. Haynes, "Elevated temperature microstructural stability in cast AlCuMnZr alloys through solute segregation" *Materials Science and Engineering A*, Volume 765, pp. 138279, September 2019.
- L. F. Allard, D. N. Leonard, J. D. Poplawsky, M. F. Chisholm, B. D. Eckhart, **A. Shyam**, F. S. Walden, B. B. Larson, R. Kelly, A. Stokes, W. C. Bigelow "The Utility of Xe-Plasma FIB for Preparing Aluminum Alloy Specimens for MEMS-based In Situ Double-Tilt Heating Experiments" *Microscopy and Microanalysis*, Volume 25, pp. 1442-1443, August 2019.

- P. Shower, J. R. Morris, D. Shin, B. Radhakrishnan, J. D. Poplawsky and **A. Shyam**, "Mechanisms for stabilizing θ' (Al₂Cu) precipitates at elevated temperatures investigated with phase field modeling" *Materialia*, Volume 6, pp. 100335, June 2019.
- D. Pierce, A. Haynes, J. Hughes, R. Graves, P. Maziasz, G. Muralidharan, **A. Shyam**, B. Wang, R. England and C. Daniel, "High Temperature Materials for Heavy Duty Diesel Engines: Historical and Future Trends" *Progress in Materials Science*, Volume 103, pp. 109-179, June 2019.
- P. Shower, J. R. Morris, D. Shin, B. Radhakrishnan, L. F. Allard and **A. Shyam**, "Temperature-dependent stability of θ' -Al₂Cu precipitates investigated with phase field simulations and experiments" *Materialia*, Volume 5, pp. 100185, March 2019.
- G. Bruno, M. Kachanov, I. Sevostianov and **A. Shyam**, "Micromechanical modeling of non-linear stress-strain behavior of polycrystalline microcracked materials under tension" *Acta Materialia*, Volume 164, pp. 50-59, February 2019.
- J. Wang, Y. Nobakht, J. D. Blanks, D. Shin, S. Lee, **A. Shyam**, H. Rezayat and S. Shin, "Machine Learning for Thermal Transport Analysis of Aluminum Alloys with Precipitate Morphology" *Advanced Theory and Simulations*, 1800196, January 2019.
- J. Wang, S. Shin, A. Y. Nobakht and **A. Shyam**, "Structural Deformation and Transformation of θ' -Al₂Cu Precipitate in Al Matrix via Interfacial Diffusion" *Computational Materials Science*, Volume 156, pp. 111–120, January 2019.
- S. Bahl, S. Dryepondt, L. F. Allard, S. Suwas and **A. Shyam**, "Retardation of small creep-fatigue crack in Gr. 91 steel through the combined effects of stress relaxation, microstructural evolution and oxidation" *Metallurgical and Materials Transactions A*, Volume 49, pp. 6110–6121, December 2018.
- E. Cakmak, N. Sridharan, S. V. Venkatakrishnan, H. Z. Bilheux, L. J. Santodonato, **A. Shyam** and S. S. Babu, "Feasibility Study of Making Metallic Hybrid Materials Using Additive Manufacturing", *Metallurgical and Materials Transactions A*, Volume 49, pp. 5035–5041, October 2018.
- A. R. Moustafa, R. B. Dinwiddie, A. E. Pawlowski, D. A. Splitter, **A. Shyam** and Z. C. Cordero, "Mesostructure and porosity effects on the thermal conductivity of additively manufactured interpenetrating phase composites" *Additive Manufacturing*, Volume 22, pp. 223-229, August 2018.
- A. S. Sabau, S. Mirmiran, C. Glaspie, S. Li, D. Apelian, **A. Shyam**, J. A. Haynes and A. F. Rodriguez, "Hot-tearing assessment of multicomponent non-grain refined Al-Cu alloys for permanent mold castings based on load measurements in a constrained mold" *Metallurgical and Materials Transactions B*, Volume 49, pp. 1267-1287, June 2018.
- B. R. Müller, R. C. Cooper, A. Kupsch, A. Lange, M. Wheeler, M. P. Hentschel, A. Staude, A. Pandey, **A. Shyam** and G. Bruno, "Stress-induced microcrack density evolution in β -eucryptite ceramics: experimental observations and possible route to strain hardening" *Acta Materialia*, Volume 144, pp. 627-641, February 2018.
- D. Shin, **A. Shyam**, S. Lee, Y. Yamamoto and J. A. Haynes, "Solute Segregation at the Al/ θ' -Al₂Cu Interface in Al-Cu Alloys" *Acta Materialia*, Volume 141, pp. 327-340, December 2017.
- A. E. Pawlowski, Z. C. Cordero, M. R. French, J.K. Carver, T. R. Muth, R. B. Dinwiddie, A. M. Elliott, **A. Shyam** and D. A. Splitter, "Producing hybrid metal composites by combining additive manufacturing and casting" *Advanced Materials & Processes*, vol. 175, no. 7, pp. 16-21, October 2017 (**Invited feature article and cover page**).
- D. Shin, S. Lee, **A. Shyam** and J. A. Haynes, "Petascale Supercomputing to Accelerate the Design of High-Temperature Alloys", *Science and Technology of Advanced Materials*, vol. 18, no. 1, pp. 828-838, 2017 (**Invited article**).
- D. Shin, S. Roy, T. R. Watkins and **A. Shyam**, "Lattice Mismatch Modeling of Aluminum Alloys" *Computational Materials Science*, Volume 138, pp. 149-159, October 2017.
- A. E. Pawlowski, Z. C. Cordero, M. R. French, J.K. Carver, T. R. Muth, R. B. Dinwiddie, A. M. Elliott, **A. Shyam** and D. A. Splitter, "Damage-tolerant metallic composites via melt infiltration of additively manufactured preforms" *Materials & Design*, Volume 127, pp. 346-351, August 2017.
- R. C. Cooper, G. Bruno, M. Wheeler, A. Pandey, T. R. Watkins, **A. Shyam**, "Effect of microcracking on the uniaxial tensile response of β -eucryptite ceramics: experiments and constitutive model" *Acta Materialia*, Volume 135, pp. 361-371, August 2017.
- P. Shower, S. Roy, C. S. Hawkins, **A. Shyam**, "The Effects of Microstructural Stability on the Compressive Response of two Cast Aluminum Alloys up to 300°C", *Materials Science & Engineering A*, Volume 700, pp. 519–529, July 2017.
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STUDENTS SUPERVISED

- Post-doctoral Researchers
 - Janet Meier – September 2022 to present
 - Richard Michi – March 2020 to March 2022 – Currently at Owens Corning
 - Sumit Bahl – January 2019 to January 2022 – Currently Research Staff at ORNL
 - Shibayan Roy – November 2013 to November 2015 – Current position – Assistant Professor, Indian Institute of Technology, Kharagpur, India
 - Ryan Cooper – February 2014 to July 2016 – Current position – Assistant Professor in Residence, Mechanical Engineering, University of Connecticut
 - Amit Pandey – October 2011 to October 2013 – Current position – Lockheed Martin - Space
- Graduate Students
 - Brian Milligan (Colorado School of Mines – PhD) – September 2017 – March 2021
 - Patrick Shower (UT Knoxville Bredesen Center – PhD) – January 2015 – July 2019
 - Alexander Ladouceur (UT Knoxville - MS) – May 2010 – May 2011
 - Zach Ladouceur (UT Knoxville – BS+MS) – June 2011 – November 2014
- Technician Interns – Tyson Jordon (Pellissippi State Community College), Dana McClurg (Pellissippi State Community College), Rick Lowden (Pellissippi State Community College)
- Undergraduate Students and Interns – Olivia Miller (University of Florida), Karla Wagner (Georgia Tech), Joseph Muth (Purdue University), Cary Kuliasha (UT Knoxville), Zach Ladouceur (UT Knoxville), Marshall Ishmael (Rose-Hulman), Matthew Wheeler (Ohio State University), Brian Milligan (Colorado School of Mines), Phil Staublin (Michigan Technological University)

PRESENTATIONS

- J. Poplawsky, R. Michi, L. Allard, S. Bahl, D. Shin, A. Plotkowski, A. Shyam, "Designing Stable θ' /L12 Co-precipitates in Cast and Additively Manufactured Al-Cu-Mn-Zr Alloys" (Invited Presentation) MS&T 2022, Pittsburgh, October 2022.
- J. Jun, A. Plotkowski, A. Shyam, J. Haynes, Y. Su, "Corrosion Evaluation of Additively Manufactured Al-Cu-X Alloys" MS&T 2022, Pittsburgh, October 2022.
- A. Perrin, S. Bahl, D. Leonard, A. Plotkowski, A. Shyam, R. Dehoff, Y. Yang, "Phase Stability in Cast and Additively Manufactured Al-9 wt%Cu-6 wt.% Ce Alloy" MS&T 2022, Pittsburgh, October 2022.
- J. Poplawsky, R. Michi, S. Bahl, B. Milligan, P. Shower, L. Allard, M. Chisholm, D. Shin, K. Sisco, A. Plotkowski, R. Dehoff, A. Haynes, A. Shyam, "Precipitate Strengthening and Stabilization Mechanisms in Cast and Additively Manufactured Al-Cu-Mn-Zr Alloys" TMS Annual Meeting, Virtual, March 2022.
- J. Allen, J. Cheng, X. Hu, D. Splitter, A. Shyam, "Modeling Hypervelocity Impacts in Additively Manufactured Interpenetrating Composites" TMS Annual Meeting, Virtual, March 2022.

- T. Ajantiwalay, R. Michie, A. Shyam, A. Plotkowski, A. Devaraj, “Correlating the Microstructure and Mechanical Properties of Additively Manufactured Al-Ce Alloys Using In-situ Micromechanical Testing” TMS Annual Meeting, Virtual, March 2022.
- S. Bahl, R. Michi, K. Sisco, D. Leonard, L. Allard, J. Poplawsky, R. Dehoff, A. Shyam, A. Plotkowski, “Elevated Temperature Deformation Behavior of Al-Cu-Ce(-Zr) Alloys Produced by Laser Powder Bed Fusion Process” TMS Annual Meeting, Virtual, March 2022.
- R. Michi, K. Sisco, S. Bahl, Y. Yang, J. Poplawsky, L. Allard, R. Dehoff, A. Plotkowski, A. Shyam “Implications of Zr Additions for High-temperature Performance of Additively Manufactured Aluminum Alloys” TMS Annual Meeting, Virtual, March 2022.
- A. Shyam, S. Bahl, A. Plotkowski, J. Simpson, R. Michi, K. Sisco, R. Dehoff, A. Haynes, Q. Wang, “The Elevated Temperature High Cycle Fatigue Behavior of an Additively Manufactured Al-Ce-Ni-Mn Alloy” TMS Annual Meeting, Virtual, March 2022.
- R. Michi, K. Sisco, S. Bahl, J. Poplawsky, L. Allard, R. Dehoff, A. Plotkowski, A. Shyam, “Microstructural and Strength Evolution during Aging of an Additively Manufactured Al-Cu-Mn-Zr Alloy” MS&T 2021, Virtual, October 2021.
- J. Jun, A. Shyam, J. Haynes, Y. Su, “Effect of Copper Contents on Corrosion of High Performance ACMZ Cast Aluminum Alloys” MS&T 2021, Virtual, October 2021.
- K. Sisco, S. Bahl, M. Chisholm, R. Michi, J. Poplawsky, A. Shyam, R. Dehoff, A. Plotkowski, S. Babu, “Solidification Structure Characterization of an AlCuMnZr Alloy with respect to geometric features and Multiple Parameters” TMS Annual Meeting, Virtual, March 2021.
- S. Bahl, X. Hu, J. Cheng, E. Hoar, K. Sisco, R. Michi, J. Haynes, A. Shyam, “Fracture Mechanisms under Monotonic Tensile, Fatigue, and Creep Deformation of Cast Al-Cu-Mn-Zr Alloys: Impact of Brittle Intermetallic Grain Boundary Particles” TMS Annual Meeting, Virtual, March 2021.
- D. Shin, J. Peng, S. Bahl, A. Shyam, J. Haynes, “Solute-vacancy Clustering in Aluminum” TMS Annual Meeting, Virtual, March 2021.
- B. Gwalani, J. Liu, J. Poplawsky, A. Shyam, A. Devaraj, “Pseudo-in situ Characterization of Phase Transformation in an Al-Cu-Mn-Zr Alloy Using Atom Probe Tomography” TMS Annual Meeting, Virtual, March 2021.
- J. Poplawsky, B. Milligan, P. Shower, L. Allard, M. Chisholm, D. Shin, A. Shyam, “The Synergistic Role of Mn and Zr/Ti in Producing θ' /L1₂ Coprecipitates in Al-Cu Alloys” TMS Annual Meeting, Virtual, March 2021.
- B. Milligan, D. Ma, L. Allard, A. Shyam, Amy Clarke, “Impact of Precipitate Size, Orientation, and Temperature on Strain Hardening Behavior in Al-Cu Alloys” TMS Annual Meeting, Virtual, March 2021.
- S. Bahl, K. Sisco, J. Poplawsky, R. Michi, L. Allard, R. Dehoff, A. Plotkowski, A. Shyam, “Elevated Temperature Dip in Tensile Elongation of an Additively Manufactured Al-Cu-Ce Alloy” TMS Annual Meeting, Virtual, March 2021.
- R. Michi, K. Sisco, S. Bahl, J. Poplawsky, L. Allard, R. Dehoff, A. Plotkowski, A. Shyam, “Microstructural Stability and Creep Behavior of an Additively Manufactured Al-Ce-Ni-Mn Alloy” TMS Annual Meeting, Virtual, March 2021.
- J. Poplawsky, P. Shower, L. Allard, M. Chisholm, D. Shin, and A. Shyam, “High Temperature Microstructural Stability Mechanisms Revealed by Microscopy in Al-Cu-Mn-Zr Alloys” (**Invited Presentation**) TMS Annual Meeting, San Diego, February 2020.
- M. Chisholm, D. Shin, G. Duscher, L. Allard and A. Shyam, “Atomic Structures and Processes in Al-Cu alloys” TMS Annual Meeting, San Diego, February 2020.
- A. Plotkowski, R. Dehoff, K. Sisco, A. Shyam, Sumit Bahl and Andres Rossy, “Selective Laser Melting and Mechanical Properties of Al-Ce-X Alloys” TMS Annual Meeting, San Diego, February 2020.
- A. Sabau, S. Mirmiran, C. Glaspie, S. Li, D. Apelian, A. Shyam, A. Rodriguez and J. Haynes, “Assessment of Grain Refinement on Hot-tearing of New Multicomponent Al-Cu Alloys” TMS Annual Meeting, San Diego, February 2020.
- S. Bahl, J. Cheng, E. Hoar, X. Hu, A. Haynes and A. Shyam, “Mapping the Mechanical Property Space of Al-Cu-Mn-Zr (ACMZ) Cast Aluminum Alloys with Superior Microstructural Stability” TMS Annual Meeting, San Diego, February 2020.
- J. Cheng, X. Hu, M. Gussev, D. Splitter and A. Shyam, “Study of Transition in Mechanical Properties Of A356/316L Additively Manufactured Interpenetrating Phase Composites” TMS Annual Meeting, San Diego, February 2020.
- K. Sisco, A. Plotkowski, K. Sickafus, Claudia Rawn, R. Dehoff, L. Allard, S. Bahl, A. Shyam, A. Rossy and S. Babu, “Phase Transformations in Al-Ce-X Alloys” TMS Annual Meeting, San Diego, February 2020.
- A. Shyam, D. Shin, J. Poplawsky, J. Morris, P. Shower, L. Allard, M. Chisholm, T. Watkins, S. Bahl and A. Haynes “Non-equilibrium Interfacial Solute Segregation as a Thermal Stabilization Mechanism in Al-Cu Alloys” TMS Annual Meeting, San Diego, February 2020.
- B. Gwalani, E. Kautz, A. Shyam, J. Poplawsky and Arun Devaraj, “Pseudo-*in situ* Characterization of Phase Transformation in an Al-Cu-Mn-Zr Alloy using Atom Probe Tomography” TMS Annual Meeting, San Diego, February 2020.
- D. Shin, A. Shyam, L. Allard, M. Chisholm, J. Poplawsky and J. Haynes, “Harnessing the Stability of θ' -Al₂Cu at Unprecedented High Temperatures” TMS Annual Meeting, San Diego, February 2020.

- B. Milligan, D. Ma, A. Shyam and A. Clarke, “Strain Hardening of Al-Cu Alloys Investigated with *in-situ* Neutron Diffraction” TMS Annual Meeting, San Diego, February 2020.
- R. Dehoff, A. Plotkowski, K. Sisco, P. Brackman, P. Bhattad, C. Frederick, A. Rossy and A. Shyam, “Rapid Characterization of AM Components for Alloy Design and Process Optimization” TMS Annual Meeting, San Diego, February 2020.
- J. Morris, G. Samolyuk, D. Shin, P. Shower, L. Allard, M. Chisholm, J. Poplawsky and A. Shyam, “Modeling Solute Interfacial Segregation Effects on θ' Precipitates in Al-Cu Alloys” MS&T 2019, Portland, September 2019.
- S. Bahl, J. Cheng, X. Hu, A. Haynes and A. Shyam, “Role of Cu Content in Determining the Mechanical Behavior of Cast Al-Cu-Mn-Zr Alloys” MS&T 2019, Portland, September 2019.
- D. Shin, A. Shyam, L. Allard, M. Chisholm, J. Morris and J. Haynes, “Revisiting Cast Al-Cu Alloy with Advanced Characterization and Modern Supercomputing” (**Invited Presentation**) MS&T 2019, Portland, October 2019.
- R. Wheeler *et al.* “Evolving Methods in the Measurement of Micromechanical Properties of Materials” (**Invited Presentation**) TMS Annual Meeting, San Antonio, March 2019.
- A. Shyam, D. Shin, P. Shower, L. Allard, J. Poplawsky, Y. Yamamoto, J. Morris and J. A. Haynes, “Mechanisms of Phase Stabilization in AlCuMnZr (ACMZ) Alloys” TMS Annual Meeting, San Antonio, March 2019.
- P. Shower, J. Morris, D. Shin and A. Shyam, “The Thermodynamic and Kinetic Effects of Microalloying Elements in Al-Cu Alloys” (**Invited Presentation**) TMS Annual Meeting, San Antonio, March 2019.
- B. Milligan, D. Ma, A. Shyam, A. Clarke, L. F. Allard and F. Coury, “Examining Deformation Mechanisms in Al-Cu Alloys with In-situ Neutron Diffraction” MS&T 2018, Columbus, October 2018.
- P. Shower, D. Shin, L. Allard, J. Morris, J. Poplawsky and A. Shyam, “ θ' to θ Transformation in Al-Cu Alloys Investigated with Phase Field Simulations, Advanced Characterization, and Mathematical Analysis” MS&T 2018, Columbus, October 2018.
- A. Shyam, P. Shower, D. Shin, Y. Yamamoto, J. Morris, L. Allard, J. Poplawsky and J. A. Haynes, “Solute Interfacial Segregation as an Elevated Temperature Strengthening Mechanism in Precipitation Hardened Alloys” ICSMA 2018, Columbus, July 2018
- B. Milligan, A. Shyam, A. Clarke and D. Ma, “Observation and Modeling of Strain Hardening Anisotropy in Al-Cu Alloys” ICSMA 2018, Columbus, July 2018 (poster presentation).
- A. Shyam *et al.*, “Prevention of Coarsening Induced Phase Transformations in Al-Cu Alloys: Role of Interfaces” TMS Annual Meeting, Phoenix, March 2018.
- S. Bahl, S. Dryepondt, L. Allard, S. Suwas and A. Shyam, “Creep-oxidation-small Fatigue Crack Interaction in Grade 91 Steel” TMS Annual Meeting, Phoenix, March 2018.
- Z. Cordero, M. French, A. Pawlawski, D. Splitter and A. Shyam, “Additive Manufacturing of Periodic Metal-metal Composite” (**Invited Presentation**) TMS Annual Meeting, Phoenix, March 2018.
- D. Shin, S. Roy, T. R. Watkins and A. Shyam, “Lattice Mismatch Modeling of Aluminum Alloys” TMS Annual Meeting, Phoenix, March 2018.
- K. Unocic, A. Shyam, S. Dryepondt and P. Maziasz, “Effects of CO₂ on Fatigue and Creep Properties of the Ni-base Alloy 282” TMS Annual Meeting, Phoenix, March 2018.
- B. Milligan, D. Ma, L. Allard, A. Clarke and A. Shyam, “Impact of Microstructural Features on the Grain-orientation Dependent Strain Hardening and Softening Mechanisms in Al-Cu Alloy” TMS Annual Meeting, Phoenix, March 2018.
- P. Shower, J. Morris, D. Shin, B. Radhakrishnan, L. Allard, J. Poplawsky and A. Shyam, “A Phase Field Theory Based Study of the Role of Microalloying Elements in Determining the Microstructural Stability of Al-Cu Alloy” TMS Annual Meeting, Phoenix, March 2018.
- A. Pawlawski *et al.*, “Additive Manufacturing of Interpenetrating Phase Composites with Exceptional Damage-tolerance”, MS&T 2017, October 2017.
- T. R. Watkins *et al.* “Characterization of Aluminum Alloys for Cylinder Heads” Denver X-Ray Conference, August 2017.
- A. Sabau *et al.* “Hot-tearing of multicomponent Al-Cu alloys based casting load measurements in a constrained permanent mold” ICME 2017 Conference, Ypsilanti, May 2017.
- P. Shower *et al.* “The evolution of θ' precipitates in an Al-Cu alloy investigated with Phase Field theory” (invited talk for Patrick in Gordon Research Seminar and Gordon Research Conference Poster 2017).
- D. Shin, A. Shyam and J. A. Haynes “High temperature cast aluminum alloys for next generation automotive engines” NASA JPL, Los Angeles, CA, April 2017.
- A. Shyam, D. Shin and J. A. Haynes “High temperature cast aluminum alloys for next generation automotive engines” SpaceX, Los Angeles, CA April 2017.
- A. Shyam, D. Shin, S. Roy, L. F. Allard Jr., Y. Yamamoto, T. R. Watkins and J. A. Haynes, “High temperature aluminum alloy development: computational thermodynamics and kinetics” (**Invited Presentation**) TMS Annual Meeting, San Diego, February 2017.
- S. Dryepondt, A. Shyam, S. Bahl, C. S. Hawkins and D. McClurg, “Creep-Fatigue-Oxidation Interactions under Fossil Energy Service Conditions” (**Invited Presentation**) TMS Annual Meeting, San Diego, February 2017.

- B. Milligan, S. Roy, C. S. Hawkins, P. Shower and A. Shyam, “Creep behavior of cast Aluminum-Copper alloys at 300°C” (Poster Presentation) TMS Annual Meeting, San Diego, February 2017.
- T. R. Watkins, A. Shyam, Y. Yamamoto, N. Sridharan, E. Cakmak, K. Unocic, R. Dehoff, S. Gorti, S. Simunovic and S. S. Babu, “Multiphase samples built by additive manufacturing” TMS Annual Meeting, San Diego, February 2017.
- A. Pandey, R. Wheeler, A. Shyam and T. Stoughton, “Elastic-Anelastic-Inelastic Boundaries in Materials for High Temperature Applications” TMS Annual Meeting, San Diego, February 2017.
- T. R. Watkins, S. Roy, L. F. Allard Jr., A. Shyam, D. Shin, and J. A. Haynes, “X-ray and microstructural study of a set of cast aluminum alloys” (Poster Presentation) TMS Annual Meeting, San Diego, February 2017.
- A. Shyam, D. Shin, S. Roy, A. Sabau, Y. Yamamoto, and J. A. Haynes, “An assessment of modeling tools for high temperature aluminum alloy development: The Good, the Bad and the Ugly” (**Invited Presentation**) TMS Annual Meeting, San Diego, February 2017.
- A. S. Sabau, S. Mirmiran, C. Glaspie, S. Li, D. Apelian, A. Shyam, J. A. Haynes, and A. F. Rodriguez, “Hot-tearing of multicomponent Al-Cu alloys based casting load measurements in a constrained permanent mold” TMS Annual Meeting, San Diego, February 2017.
- R. C. Cooper, G. Bruno, Y. Onel, A. Lange, T. R. Watkins, A. Shyam, “Young's Modulus and Poisson's ratio changes in machined porous microcracked cordierite” TMS Annual Meeting, San Diego, February 2017.
- P. T. Shower, B. Radhakrishnan, J. R. Morris and A. Shyam, “The evolution of θ' precipitates in an Al-Cu alloy investigated with Phase Field theory” TMS Annual Meeting, San Diego, February 2017.
- D. Shin, S. Roy, L.F. Allard Jr., J. A. Haynes and A. Shyam, “Solute Segregation in Aluminum Alloys” TMS Annual Meeting, San Diego, February 2017.
- A. Shyam, “High temperature cast aluminum alloys for next generation automotive engines” Rice University, December 2016. (**Invited Presentation**)
- D. Shin, A. Shyam and J. A. Haynes, “Petascale Supercomputing to Accelerate the Design of High-Temperature Alloys” WMRI 5th International Workshop for Young Scientists, Tsukuba, Japan, November 2016.
- T. R. Watkins, A. Shyam, Y. Yamamoto, N. Sridharan, E. Cakmak, K. Unocic, R. Dehoff, S. Gorti, S. Simunovic and S. S. Babu, “Multiphase samples built by additive manufacturing” Denver X-ray conference, August 2016.
- A. Shyam, “High performance cast aluminum alloys for next generation passenger vehicle engines” DOE Vehicle Technologies Annual Merit Review, Washington DC, June 2016.
- P. T. Shower, S. Roy, C. S. Hawkins, L.F. Allard Jr. and A. Shyam, “The high temperature compression response of Al 319-T7” TMS Annual Meeting, February 2016.
- A. Shyam, M. Sangid, S. Roy, S. Dryepondt, D. Saha and P. Maziasz, “The effect of microstructure and steam environment on the fatigue behavior of Alloy 282” (**Invited Presentation**) 7th International Conference on Creep, Fatigue and Creep-Fatigue Interaction, Kalpakkam, India, January 2016.
- R. C. Cooper, G. Bruno and A. Shyam, “Evolution of microcrack density under tensile loading in α -eucryptite” MRS Fall Meeting, Boston, December 2015.
- S. Roy, B. Mazumder, L. F. Allard, D. Shin, T. R. Watkins and A. Shyam, “Crystallographic and compositional evolution of nano-scale precipitates in 206 aluminum alloy” (Poster Presentation) Gordon Conference on Physical Metallurgy, July 2015.
- P. T. Shower, S. Roy, C. S. Hawkins and A. Shyam, “Elevated temperature deformation response in a 319 aluminum alloy” (Poster Presentation) Gordon Conference on Physical Metallurgy, July 2015.
- A. Shyam, “High performance cast aluminum alloys for next generation passenger vehicle engines” DOE Vehicle Technologies Annual Merit Review, Washington DC, June 2015.
- S. Roy, L. F. Allard and A. Shyam, “Micro and meso-scale strength modeling of cast aluminum alloys” TMS Annual Meeting, Orlando, March 2015.
- R. C. Cooper, A. Pander, Z. R. Ladouceur, A. Shyam and T. R. Watkins, “Nonlinear and anisotropic mechanical response of porous microcracked ceramics” TMS Annual Meeting, Orlando, March 2015.
- R. C. Cooper, S. Roy, A. Sabau, C. S. Hawkins and A. Shyam, “Defect modeling and endurance limit prediction for cast aluminum alloys” (**Invited Presentation**) TMS Annual Meeting, Orlando, March 2015.
- M. Wheeler, A. Kinnard, R. C. Cooper, A. Shyam and A. Pandey, “Thermomechanical response of porous and microcracked ceramic materials” TMS Annual Meeting, Orlando, March 2015.
- R. C. Cooper, A. Pandey, R. J. Parten, E. Lara-Curzio, G. Bruno, A. Shyam and T. R. Watkins, “The effect of machining on the mechanical properties of porous microcracked cordierite” 38th International Conference on Advanced Ceramics and Composites, Daytona Beach, January 2015.
- R. C. Cooper, A. Pandey, Z. R. Ladouceur, A. Shyam and T. R. Watkins, “Nonlinear mechanics of porous microcracked ceramics” MRS Fall Meeting, Boston, December 2014.
- S. Roy, C. S. Hawkins, D. R. McClurg, G. Muralidharan and A. Shyam, “Microstructure-mechanical property correlation in several cast aluminum alloys”, MS&T 2014, October 2014.
- A. Shyam, S. Roy, S. N. Dryepondt, P. J. Maziasz, M. D. Sangid and D. Saha, “Microstructural variables that affect the fatigue crack initiation location in a nickel-base superalloy at elevated temperature” (**Invited Presentation**) 51st Annual SES Technical Meeting, West Lafayette, October 2014.

- G. Muralidharan, M. P. Brady, A. Shyam, Y. Yamamoto, J. A. Haynes, R. Weldon, R. England, “New materials for high temperature exhaust manifolds” SAE commercial vehicle engineering congress, October 2014.
- A. Shyam, S. Hawkins, S. Roy, S. Dryepontd, D. Erdman and P. Maziasz, “The effect of steam on the elevated temperature high cycle fatigue life of Alloy 282” 10th Liege Conference on Materials for Advanced Power Engineering, Liege (Belgium), September 2014 (poster presentation).
- R. Wheeler, D. Bhattacharya, A. Pandey, A. Shyam, A. Shiveley and D. Sergison, “Structure-property investigations via SEM in-situ micromechanical testing” Microscopy & Microanalysis 2014, Hartford, August 2014.
- A. Shyam, “The thermomechanical behavior of porous microcracked ceramics” Materials and Chemistry Seminar Series, Oak Ridge National Laboratory, May 2014.
- A. Shyam, “The thermomechanical behavior of porous microcracked ceramics” Oak Ridge Chapter of ASM Seminar, Knoxville, May 2014.
- A. Pandey, A. Shyam, Z. Liu, R. Goettler and G. Agnew, “An overview of the mechanical properties of the thick substrate and thin active layers in a planar Solid-Oxide Fuel Cell (SOFC)” Fuel Cells 2014 Science & Technology, Amsterdam, April 2014.
- T.R. Watkins, A. Shyam, C. M. Parish and K. J. Wright, “Proposed mechanism for increase in the fracture toughness of porous SiC at elevated temperature” MRS Meeting, San Francisco, April 2014.
- A. Pandey, A. Shyam, Z. Liu and R. Goettler, “Elastic properties of thin ceramic multilayers in a solid oxide fuel cell” TMS Annual Meeting, San Diego, March 2014.
- M. Wheeler, A. Pandey, G. Bruno and A. Shyam, “The uniaxial tensile response of β -eucryptite with varying levels of microcracking: experiments and modeling” 37th International Conference on Advanced Ceramics and Composites, Daytona Beach, January 2014.
- A. Shyam, S. Hawkins, D. Erdman, R. England and G. Muralidharan, “Constrained thermal fatigue performance of several cast ferrous alloys” (**Invited Presentation**) THERMEC 2013, Las Vegas, December 2013.
- B. Radhakrishnan, A. Shyam, C. M. Parish, J. M. Miller and T. A. Burrell, “Development of Fe-6.5Si-B steels for electric vehicle applications” Advanced Power Electronics and Electric Motors R&D Meeting, Oak Ridge, November 2013.
- A. Pandey, A. Shyam, T. R. Watkins and K. J. Hemker, “Elastic Moduli of Porous and Microcracked Ceramics: Effect of Temperature and Loading” Mach Conference 2013, Annapolis (MD), April 2013. (Poster Presentation)
- A. Pandey, R. Wheeler and A. Shyam, “Microscale Observations on the Definitions of Elastic Limit and Yield Point” TMS Annual Meeting, San Antonio, March 2013. (Poster Presentation)
- A. Shyam, A. Pandey, Z. Feng, W. H. Peter, S. R. Agnew and B. Radhakrishnan, “The mechanical behavior of magnesium alloys subjected to severe plastic deformation” Magnesium Technology 2013, TMS Annual Meeting, San Antonio, March 2013. (Poster Presentation)
- A. Shyam, D. McClurg, A. Pandey, R. Trejo, A. Marquez, R. Lowden, E. Lara-Curzio and R. Goettler, “An overview of the mechanical behavior of solid oxide fuel cell substrates” (**Invited Presentation** to the symposium on Materials in Clean Power Systems VIII: Durability of Materials) TMS Annual Meeting, San Antonio, March 2013.
- A. Pandey, A. Shyam, E. Lara-Curzio, T. R. Watkins and R. J. Stafford, “Uniaxial tensile response of microcracked porous ceramics” 37th International Conference on Advanced Ceramics and Composites, Daytona Beach, January 2013.
- A. Shyam, D. McClurg, A. Pandey, R. Trejo, E. Lara-Curzio and R. Goettler, “The mechanical behavior of solid oxide fuel cell substrates in relevant environments” 37th International Conference on Advanced Ceramics and Composites, Daytona Beach, January 2013.
- G. Dwivedi, V. Viswanathan, A. Shyam, E. Lara-Curzio, S. Sampath, “Effect of microstructure on the fracture toughness of plasma sprayed thermal barrier coatings” 37th International Conference on Advanced Ceramics and Composites, Daytona Beach, January 2013.
- K. Hoff, G. Bruno, T. Montigny, X. Luo, A. Shyam, T. R. Watkins and R. J. Parten, “Influence of specimen preparation on the double torsion fracture toughness results for two extruded porous microcracked cordierite compositions” 37th International Conference on Advanced Ceramics and Composites, Daytona Beach, January 2013.
- A. Pandey, R. Wheeler, T. Tan, E. Lara-Curzio and A. Shyam, “Efficient Specimen Fabrication for In-situ Micromechanical Testing” MS&T 2012, Pittsburgh, October 2012.
- A. Pandey, A. Shyam, T. R. Watkins and E. Lara-Curzio, “The uniaxial stress-strain response of microcracked porous ceramics” Gordon Research Conference on Solid State Studies in Ceramics, South Hadley (MA), August 2012 (Poster Presentation).
- E. Lara-Curzio, A. Pandey, A. Shyam and T. R. Watkins, “Characterization of crack healing in porous ceramics due to thermal cycling” 4th International Congress on Ceramics (ICC4), Chicago, July 2012.
- A. Pandey, R. Wheeler, A. Shyam and E. Lara-Curzio, “Deformation behavior of Li-ion cell materials” Gordon Research Conference on Thin Films, Waterville (ME), July 2012 (Poster Presentation).
- A. Shyam, R. Trejo, V. Garcia-Negron, A. Ladouceur, M. Kirkham, D. McClurg, Z. Ladouceur, E. Lara-Curzio, “Effect of environmental exposure on the microstructural stability of two alkali barium silicate

- glasses” 36th International Conference on Advanced Ceramics and Composites, Daytona Beach, January 2012.
- T. R. Watkins, K. Wright, A. Shyam and R. Stafford, “Fracture Toughness of Porous SiC at Elevated Temperature” 36th International Conference on Advanced Ceramics and Composites, Daytona Beach, January 2012.
 - Z. Chen, A. Shyam, J. Huang, R. Decker, S. LeBeau and C. Boehlert, “The Small Fatigue Crack Growth Behavior of an AM60 Magnesium Alloy” MS&T 2011, Columbus, October 2011.
 - A. Shyam, P. J. Blau, T. Jordan and N. Yang, “The fatigue behavior of high strength tool steel materials” MS&T 2011, Columbus, October 2011.
 - T. R. Watkins, A. Shyam and R. J. Stafford, “Microstructure and Select Mechanical Properties of Three Porous Ceramic Materials” 242nd American Chemical Society National Meeting & Exposition, Denver, August 2011.
 - A. Shyam, R. M. Trejo, V. Garcia-Negron, A. Ladouceur, D. Isheim and E. Lara-Curzio, “Characterization of glasses for SOFC sealing applications” 12th Annual SECA Workshop, Pittsburgh, July 2011 (Poster Presentation).
 - A. Shyam, P. J. Blau, T. Jordan, N. Yang and M. J. Pollard, “The very high cycle fatigue behavior of tool steel materials for diesel fuel injectors” 5th International Conference on Very High Cycle Fatigue (VHCF5), Berlin (Germany), June 2011.
 - D. Kumar, S. Dryepondt, A. Shyam, J. A. Haynes, B. L. Armstrong, B. A. Pint, and E. Lara-Curzio, “Low-cycle-fatigue behavior of coated and uncoated CF8C-Plus between 600oC to 800°C” TMS Annual Meeting, San Diego, February 2011.
 - Z. Chen, A. Shyam, J. Howe, J. Huang, R. Decker, S. LeBeau and C. Boehlert, “The Effect of Thermomechanical Processing on the Small Fatigue Crack Growth Behavior of an AM60 Mg Alloy” Magnesium Technology 2011, TMS Annual Meeting, San Diego, February 2011.
 - A. Shyam, R. M. Trejo, D. McClurg, J. Muth, M. Kirkham and E. Lara-Curzio, “Effect of environmental exposure on the microstructural stability of an alkali barium silicate glass” 35th International Conference on Advanced Ceramics and Composites, Daytona Beach, January 2011.
 - A. Shyam, J. M. Giaquinto, C. K. Bayne, D. C. Glasgow, R. H. Ilgner, T. J. Keever and E. Lara-Curzio, “The uncertainty of techniques used for quantitative chemical composition of SOFC glass seal materials” 35th International Conference on Advanced Ceramics and Composites, Daytona Beach, January 2011.
 - T. R. Watkins, A. Shyam and R. J. Stafford, “Elevated Temperature Fracture Toughness Behavior of Porous Ceramic Materials” 35th International Conference on Advanced Ceramics and Composites, Daytona Beach, January 2011.
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- A. Shyam, R. M. Trejo, V. Garcia-Negron, A. Ladouceur, D. Isheim and E. Lara-Curzio, "Characterization of glasses for SOFC sealing applications" 12th Annual SECA Workshop, Pittsburgh, July 2011 (Poster Presentation).
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- T. R. Watkins, K. Wright, A. Shyam and R. Stafford, "Fracture Toughness of Porous SiC at Elevated Temperature" 36th International Conference on Advanced Ceramics and Composites, Daytona Beach, January 2012.
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- T. R. Watkins, A. Shyam, E. Lara-Curzio and R. J. Stafford, "Microstructure and select mechanical properties of aluminum titanate diesel particulate filter (DPF) substrates" 34th International Conference on Advanced Ceramics and Composites, Daytona Beach, January 2010.
- A. Shyam and E. Lara-Curzio, "Advanced Mechanical Characterization of Plasma Sprayed Thermal Spray Coatings" 2010 Fall Consortium Meeting and Workshop for Thermal Spray Technology in June 2010 in SUNY Stonybrook, June 2010.
- E. Lara-Curzio, A. Shyam, R. M. Trejo, D. R. McClurg, J. T. Muth, M. J. Kirkham and J. Y. Howe, "Reliability of Materials and Components for Solid Oxide Fuel Cells" 11th Annual SECA Workshop, Pittsburgh, July 2010.
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- "Microstructure-property relationships in diesel particulate filter (DPF) substrates", MS&T, Pittsburgh 2008 (with E. Lara-Curzio and T.R. Watkins).
- "Small fatigue crack growth modeling and its implications for worst-case life prediction", MS&T, Pittsburgh 2008 (with E. Lara-Curzio, J.W. Jones and J.E. Allison).
- "Determination of Elastic Properties of Solids at High Temperatures by Resonant Ultrasound Spectroscopy", in Ultra-High Temperature Ceramics: Materials for Extreme Environment Applications, Engineering Conferences International, Lake Tahoe 2008 (with M. Radovic, E. Lara-Curzio, M. Manisha, F. Pavia and M.W. Barsoum).
- "Cathode-Interconnect Interfacial Properties", 9th Annual SECA Workshop, Pittsburgh 2008 (with Edgar Lara-Curzio, Yanli Wang, Rosa Trejo, Beth Armstrong, John Henry, Claire Chisholm and Tom Watkins).
- "Reliability of Materials and Components for Solid Oxide Fuel Cells", DOE SECA Merit Review, Pittsburgh 2008 (with Edgar Lara-Curzio, Yanli Wang, Rosa Trejo and Beth Armstrong).
- "Durability of Diesel Engine Particulate Filters", DOE Office of Vehicle Technologies Merit Review, Washington DC 2008 (with Thomas Watkins, Edgar Lara-Curzio, Randy Stafford, Thomas Yonushonis and Cheryl Klepser).
- "Mechanical characterization of interfaces in SOFCs", 8th Annual SECA Workshop, San Antonio 2007 (with Edgar Lara-Curzio, Rosa Trejo, Scott Bell, Beth Armstrong and John Henry).
- "Fracture mechanical characterization of porous cordierite ceramics", MS&T, Detroit 2007 (with E. Lara-Curzio and T.R. Watkins).

- “Effect of thermal fatigue on the mechanical properties of Lead-Antimony-Silver-Tellurium (LAST) thermoelectric materials”, MS&T, Detroit 2007 (with J.E. Ni, F. Ren, E.D. Case and E. Lara-Curzio).
- “Ceramic Particulate Filters”, Diesel Engine-Efficiency and Emissions Research (DEER) Conference, Detroit, 2007 (with T. Yonushonis, R. Stafford, C. Klesper, T. Watkins and E. Lara-Curzio).
- “Fracture toughness of porous cordierite”, 30th International Conference on Advanced Ceramics and Composites, Cocoa Beach, 2006 (with E. Lara-Curzio, H.-T. Lin and R. J. Parten).
- “Accelerated Development of High-Fatigue-Performance Cast Aluminum Alloys for Automotive Applications”, MS&T, New Orleans 2004 (with X. Zhu, Y.N. Picard, S.M. Yalisove, J.E. Allison and J.W. Jones).
- “Ultrasonic Fatigue of a Nickel-base Superalloy at Room and Elevated Temperatures”, MS&T, New Orleans 2004 (with C. J. Torbet, C. J. Szczepanski, A. Salem, T.M. Pollock, J.W. Jones, J.M. Larsen, S.K. Jha and M.J. Caton).
- “Characterization of the Role of Microstructure on the Fatigue Life of Ti-6Al-2Sn-4Zr-6Mo Using Ultrasonic Fatigue” MS&T, New Orleans 2004 (with C. J. Szczepanski, S. K. Jha, J. M. Larsen, C. J. Torbet, S. J. Johnson and J. W. Jones).
- “Ultrasonic Fatigue of Nickel-base Superalloys at Elevated Temperatures”, Superalloys 2004 (Poster Presentation).
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- “Fatigue of Structural Alloys for Engine Applications”, Oak Ridge National Lab, Oak Ridge 2004.
- “The Use of Accelerated Test Methods in Assessing the Very Long Fatigue Life of Structural Materials”, MS&T, Chicago 2003 (with J. W. Jones, J. M. Larsen, T. M. Pollock and J. E. Allison).
- “Determination of the Fatigue Behavior of Thixomolded® Magnesium AZ91D Using Ultrasonic Techniques”, MS&T, Chicago 2003 (with A. R. Moore, C. J. Torbet and J. W. Jones).
- “Fatigue Crack Initiation and Early Propagation Behavior from Micronotches in W319 Cast Aluminum Alloy”, MS&T, Chicago 2003 (with J. W. Jones, J. E. Allison, Y.N. Picard, S.M. Yalisove and H-H Liu).
- “The Use of Ultrasonic Fatigue in the Modeling of Very Long Fatigue Life”, TMS Annual Meeting, San Diego 2003 (with J. W. Jones and M. J. Caton).
- 7th National Turbine Engine High Cycle Fatigue Conference (Materials Session), West Palm Beach 2002.
- ASME Mechanics and Materials Conference (Fatigue of Advanced Materials Session), San Diego 2001.
- TMS Conference (Fatigue and Fracture of High Temperature Materials Session), St Louis 2000.
- TMS Conference (General Abstracts Session), Cincinnati 1999.